

What is claimed is:

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1. A system for a communication station wherein the system handles both reception signals collected via an antenna and transmission signals generated by the communication station for transmission via the antenna, comprising:
- 5 a cryostat;
a receive path carrying the reception signals and disposed in the cryostat; and
a transmit path carrying the transmission signals;
- 10 wherein the receive path and the transmit path are coupled between the system and the antenna and between the system and the communication station.
2. The system of claim 1 further comprising a coupler that couples the receive path and the transmit path between the antenna and the system.
- 15 3. The system of claim 2 wherein the coupler includes a phase-adjusting portion disposed in the cryostat.
3. The system of claim 2 wherein the coupler includes a phase-adjusting portion disposed in the cryostat.
- 20 4. The system of claim 3 wherein the receive path comprises a receive filter disposed in the cryostat.
5. The system of claim 4 wherein the receive filter comprises a high-temperature superconducting material.
- 25 6. The system of claim 4 wherein the transmit path comprises a conventional transmit filter.
7. The system of claim 4 wherein the phase-adjusting portion comprises a cable that couples the receive filter to the antenna.
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(02 8. The system of claim 4 wherein the coupler comprises a further phase-adjusting portion disposed outside of the cryostat. *Fig 10*

5 9. The system of claim 4 wherein phase-adjustment via the coupler is provided solely by the phase-adjusting portion disposed in the cryostat.

(03 10. The system of claim 1 further comprising a coupler that couples the receive path and the transmit path between the system and the communication station.

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11. The system of claim 10 wherein the coupler includes a phase-adjusting portion disposed in the cryostat.

CL 8 12. The system of claim 11 wherein the coupler comprises a further phase-adjusting portion disposed outside of the cryostat.

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13. The system of claim 11 wherein phase-adjustment via the coupler is provided solely by the phase-adjusting portion disposed in the cryostat.

20 14. The system of claim 1 further comprising a duplexer that couples the receive path and the transmit path between the system and the communication station.

25 15. The system of claim 1 wherein the receive path comprises a receive filter and a low-noise amplifier.

103 Fig 16 16. The system of claim 15 wherein the receive path further comprises a further filter such that the low-noise amplifier couples the receive filter to the further filter.

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17. The system of claim 15 wherein the receive filter comprises means for protecting the receive filter from a transmission signal carried by the transmit path.

5 18. The system of claim 15 wherein the receive filter comprises a first stage modified to protect the receive filter from a transmission signal carried by the transmit path.

10 19. The system of claim 1 further comprising a cable wherein the cable carries the reception signals and the transmission signals between the system and the communication station.

15 20. The system of claim 19 wherein the antenna and the system are disposed upon an antenna tower having a length such that the cable runs the length of the antenna tower.

20 21. The system of claim 1 wherein the system is disposed upon an antenna tower.

22. A front-end system for a communication station wherein the front-end system handles both reception signals collected via an antenna and transmission signals generated by the communication station for transmission via the antenna, comprising:

- 5 a cryostat;
- a receive path carrying the reception signals and disposed in the cryostat;
- a transmit path carrying the transmission signals;
- a coupler that couples the receive path and the transmit path to the antenna and includes a phase-adjusting portion such that the transmission
- 10 signals are not carried by the receive path;
- a duplexer coupled to the receive path and the transmit path; and
- a cable coupled to the duplexer for carrying the reception signals and the transmission signals to and from the communication station, respectively.

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23. The front-end system of claim 22 wherein the receive path comprises a bandpass filter disposed in the cryostat.

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24. The front-end system of claim 23 wherein the phase-adjusting portion of the coupler is disposed in the cryostat.

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25. The front-end system of claim 23 wherein the bandpass filter comprises means for protecting the bandpass filter from the transmission signals carried by the transmit path.

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26. The front-end system of claim 23 wherein the bandpass filter comprises a first stage modified to protect the bandpass filter from the transmission signals carried by the transmit path.

27. The front-end system of claim 23 wherein the coupler comprises a further phase-adjusting portion disposed outside of the cryostat.

28. The front-end system of claim 23 wherein phase-adjustment via the coupler is provided solely by the phase-adjusting portion in the cryostat.

5 29. The front-end system of claim 22 wherein the antenna is disposed upon and supported by an antenna tower having a length such that the cable runs the length of the antenna tower to couple the front-end system to the communication station.

10 30. A front-end system for a communication station wherein the front-end system handles both reception signals collected via an antenna and transmission signals generated by the communication station for transmission via the antenna, comprising:

15 a cryostat;
a receive path carrying the reception signals and disposed in the cryostat;
a transmit path carrying the transmission signals;
a first coupler that couples the receive path and the transmit path to the antenna and includes a phase-adjusting portion such that the transmission signals are not carried by the receive path;
20 a cable for carrying the reception signals and the transmission signals to and from the communication station, respectively; and
a second coupler that couples the receive path and the transmit path to the cable and includes a phase-adjusting portion such that the transmission signals are not carried by the receive path.

25 31. The front-end system of claim 30 further comprising a cryostat wherein the receive path comprises a bandpass filter disposed in the cryostat.

30 32. The front-end system of claim 31 wherein the phase-adjusting portion of the coupler is disposed in the cryostat.

33. The front-end system of claim 31 wherein the bandpass filter comprises means for protecting the bandpass filter from the transmission signals carried by the transmit path.

5 34. The front-end system of claim 31 wherein the bandpass filter comprises a first stage modified to protect the bandpass filter from the transmission signals carried by the transmit path.

10 35. The front-end system of claim 31 wherein the coupler comprises a further phase-adjusting portion disposed outside of the cryostat.

36. The front-end system of claim 31 wherein phase-adjustment via the coupler is provided solely by the phase-adjusting portion in the cryostat.

15 37. The front-end system of claim 30 wherein the antenna is disposed upon and supported by an antenna tower having a length such that the cable runs the length of the antenna tower to couple the front-end system to the communication station.

20 38. A front-end system for a communication station wherein the front-end system handles both reception signals collected via an antenna and transmission signals generated by the communication station for transmission via the antenna, comprising:

25 a cryostat;
 a receive path carrying the reception signals and disposed in the cryostat;
 a transmit path carrying the transmission signals;
 a first cable coupled to both the receive path and the transmit path that carries both the transmission signals and the reception signals to and from the
30 antenna, respectively; and

a second cable coupled to both the receive path and the transmit path that carries both the reception signals and the transmission signals to and from the communication station, respectively.

5 39. The front-end system of claim 38 wherein the antenna is disposed upon and supported by an antenna tower having a length such that the second cable runs the length of the antenna tower to couple the receive path and the transmit path to the communication station.

10 40. The front-end system of claim 38 further comprising:
a first coupler that couples the first cable to the receive path and includes a phase-adjusting portion such that the transmission signals are not carried by the receive path;
a second coupler that couples the second cable to the receive path and
15 includes a phase-adjusting portion such that the transmission signals are not carried by the receive path.

 41. The front-end system of claim 38 further comprising:
a coupler that couples the first cable to the receive path and includes a
20 phase-adjusting portion such that the transmission signals are not carried by the receive path;
a duplexer that couples the second cable to the receive path such that the transmission signals are not carried by the receive path.

25 42. The front-end system of claim 38 wherein the receive path comprises a bandpass filter disposed in the cryostat.

 43. The front-end system of claim 42 wherein the bandpass filter comprises means for protecting the bandpass filter from the transmission
30 signals carried by the transmit path.

44. The front-end system of claim 42 wherein the bandpass filter comprises a first stage modified to protect the bandpass filter from the transmission signals carried by the transmit path.

5 45. The front-end system of claim 42 wherein the coupler comprises a further phase-adjusting portion disposed outside of the cryostat.

46. The front-end system of claim 42 wherein phase-adjustment via the coupler is provided solely by the phase-adjusting portion in the cryostat.

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47. A front-end system for a communication station wherein the front-end system handles both reception signals collected via an antenna and transmission signals generated by the communication station for transmission via the antenna, comprising:

5 a cryostat;

a receive path carrying the reception signals and disposed in the cryostat; and

a transmit path carrying the transmission signals;

10 wherein the receive path is duplexed with the transmit path such that the front-end system has a first single input/output connection for coupling the front-end system to the antenna and a second single input/output connection for coupling the front-end system to the communication station.

48. The system of claim 47 further comprising a coupler that couples
15 the receive path and the transmit path between the antenna and the system.

49. The system of claim 48 wherein the coupler includes a phase-adjusting portion disposed in the cryostat.

20 50. The system of claim 49 wherein the receive path comprises a receive filter disposed in the cryostat.

51. The system of claim 50 wherein the receive filter comprises a high-temperature superconducting material.

25 52. The system of claim 51 wherein the transmit path comprises a conventional transmit filter.

53. The system of claim 49 wherein the phase-adjusting portion
30 comprises a cable that couples the receive filter to the antenna.

54. The system of claim 49 wherein the coupler comprises a further phase-adjusting portion disposed outside of the cryostat.

5 55. The system of claim 49 wherein phase-adjustment via the coupler is provided solely by the phase-adjusting portion disposed in the cryostat.

56. The system of claim 47 further comprising a coupler that couples the receive path and the transmit path between the system and the communication station.

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57. The system of claim 56 wherein the coupler includes a phase-adjusting portion disposed in the cryostat.

58. The system of claim 57 wherein the coupler comprises a further phase-adjusting portion disposed outside of the cryostat.

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59. The system of claim 57 wherein phase-adjustment via the coupler is provided solely by the phase-adjusting portion disposed in the cryostat.

20 60. The system of claim 47 further comprising a duplexer that couples the receive path and the transmit path between the system and the communication station.